



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/991,703	11/26/2001	Claes Ohngren	024444-990	3922

7590 12/28/2004

Ronald L. Grudziecki  
BURNS, DOANE, SWECKER & MATHIS, L.L.P. -  
P.O. Box 1404  
Alexandria, VA 22313-1404

EXAMINER

KERNS, KEVIN P

ART UNIT	PAPER NUMBER
----------	--------------

1725

DATE MAILED: 12/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/991,703

Applicant(s)

OHNGREN ET AL.

Examiner

Kevin P. Kerns

Art Unit

1725

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3,5-7 and 10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,5-7 and 10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 July 2004 and 29 October 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                                   | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>12/6/04</u> .   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Priority***

1. Acknowledgment is made of applicants' claim for foreign priority based on an application filed in Sweden on November 24, 2000. It is noted, however, that applicants have not filed a certified copy of the Swedish application as required by 35 U.S.C. 119(b).

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-3, 5-7, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over England et al. (US 5,016,460) in view of Darnfors (US 5,126,107).

England et al. disclose a finned metal tube that contains at least 30% nickel and 10% chromium, such that the finned metal tube body 24 (Figure 5) includes a plurality of smoothly curved valleys/recesses 28 and a plurality of smoothly curved peaks (fins 26) extending longitudinally along the length of the inner profile region of the tube, which would be conically tapered during manufacture with a conically tapered mandrel, with the outer surface of the tube also being smoothly curved (abstract; column 1, lines 53-68; column 2, lines 20-68; column 3, lines 1, 34-39, 62-68, and Tables; column 4, lines 1-13, 34-39, and 61; column 5, lines 12-29; and Figures 1, 2, and 5). The longitudinal internal fins 26 are selectively either straight or twisted, and the twisted (helical) fins are used in furnace applications where heat transfer needs to be increased (column 4, lines 62-68; and column 5, lines 1-9). England et al. do not disclose the specific elemental compositions of the metal alloy tube.

However, Darnfors discloses an iron/nickel/chromium alloy for use in high temperature applications, in which the alloy includes 0.01-0.08% C, 1.2-2.0% Si, trace to 2% Mn, 22-29% Cr, 32-38% Ni, 0.01-0.15% rare earth metals, 0.08-0.25% N, normal impurities (including unavoidable oxides of the above metals, including Cr, on the inner surface of the metal tube, thus forming a chromium oxide layer on inner regions of the tube), and balance iron (also covering claims 5-7), with this composition being applicable to tubes in furnaces, combustion chambers, and fluidized beds, such that this composition is advantageous for improved resistance at high temperatures against

carburizing and oxidizing, while providing good creep fracture resistance and resistance to attack from gaseous halides and metal oxides (abstract; column 1, lines 5-11 and 60-68; column 2, lines 1-68; column 3, lines 1-38 and 59-68; column 4, lines 1-11; and Figures 1 and 2).

It would have been obvious to one of ordinary skill in the art at the time the applicants' invention was made to modify the finned metal tube disclosed by England et al., by using the specified elemental composition of the metal alloy for tubes in high temperature applications, as taught by Darnfors, in order to improve resistance at high temperatures against carburizing and oxidizing, while providing good creep fracture resistance and resistance to attack from gaseous halides and metal oxides (Darnfors; abstract; column 1, lines 5-11 and 60-68; and column 2, lines 1-9).

5. Claims 1, 2, and 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Olsson (US 5,206,880) in view of Ernst (US 4,478,275), and further in view of Darnfors (US 5,126,107).

Olsson discloses furnace tubes for cracking hydrocarbons, in which the furnace tubes are finned metal tubes that contain 15-30% chromium and preferably coated with an aluminum oxide layer, such that the inner surface 3 of the finned metal tube body 1 includes a plurality of smoothly curved valleys/recesses and a plurality of smoothly curved peaks (ribs 4) extending longitudinally along the length of the inner profile region of the tube, with the outer surface of the tube also being smoothly curved (abstract; column 1, lines 6-13; column 2, lines 1-56 and 63-68; column 3, lines 1-3 and 15-24;

and Figures 1 and 2). Olsson does not disclose a chromium oxide layer and the specific elemental compositions of the metal alloy tube.

However, Ernst discloses an abrasion resistant heat pipe that includes two protective layers, including a layer that includes chromium oxide (obtained from oxidation of 20-30% chromium in the first (inner) layer, such that the chromium oxide in the first layer is advantageous for protection of the heat pipe because it will not decompose in the high temperature environment of a combustion chamber (column 2, lines 5-10 and 23-27; and column 3, lines 44-68).

It would have been obvious to one of ordinary skill in the art at the time the applicants' invention was made to modify the furnace tubes for cracking hydrocarbons, as disclosed by Olsson, by using a protective layer that includes chromium oxide, as taught by Ernst, in order to protect the heat pipe so that it will not decompose in the high temperature environment of a combustion chamber (Ernst; column 2, lines 23-27; and column 3, lines 59-64).

Olsson (in view of Ernst) disclose and/or suggest the elements of the claims above, with the exception of the specific elemental compositions of the metal alloy tube.

However, Darnfors discloses an iron/nickel/chromium alloy for use in high temperature applications, in which the alloy includes 0.01-0.08% C, 1.2-2.0% Si, trace to 2% Mn, 22-29% Cr, 32-38% Ni, 0.01-0.15% rare earth metals, 0.08-0.25% N, normal impurities (including unavoidable oxides of the above metals, including Cr, on the inner surface of the metal tube, thus forming a chromium oxide layer on inner regions of the tube), and balance iron (also covering claims 5-7), with this composition being

applicable to tubes in furnaces, combustion chambers, and fluidized beds, such that this composition is advantageous for improved resistance at high temperatures against carburizing and oxidizing, while providing good creep fracture resistance and resistance to attack from gaseous halides and metal oxides (abstract; column 1, lines 5-11 and 60-68; column 2, lines 1-68; column 3, lines 1-38 and 59-68; column 4, lines 1-11; and Figures 1 and 2).

It would have been obvious to one of ordinary skill in the art at the time the applicants' invention was made to modify the furnace tubes for cracking hydrocarbons, as disclosed by Olsson, by using a protective layer that includes chromium oxide, as taught by Ernst, in order to protect the heat pipe so that it will not decompose in the high temperature environment of a combustion chamber, and by further using the specific iron/nickel/chromium alloy for use in high temperature applications, as disclosed by Darnfors, in order to improve resistance at high temperatures against carburizing and oxidizing, while providing good creep fracture resistance and resistance to attack from gaseous halides and metal oxides (Darnfors; abstract; column 1, lines 5-11 and 60-68; and column 2, lines 1-9).

### ***Response to Arguments***

6. The examiner acknowledges the applicants' response filed with the request for continued examination and another (third) Information Disclosure Statement, all of which were received by the USPTO on December 6, 2004. The prior objections to the drawings and claims were overcome by the applicants' after final amendment of

October 29, 2004, which was entered (as indicated in the advisory action mailed November 16, 2004). The (third) Information Disclosure Statement has been considered, initialed, and enclosed with this Office Action. The foreign priority papers (see paragraph 1 above) have not been received (or if received, not matched with this application). The applicants cancelled claims 8 and 9 in their after final amendment. Claims 1-3, 5-7, and 10 are currently under consideration in the application.

7. Applicants' arguments filed December 6, 2004 have been fully considered but they are not persuasive.

With regard to the applicants' remarks/arguments on pages 5-13 of the response, the major argument that the applicants set forth in addressing the 35 USC 103(a) rejections (paragraphs 4 and 5 above) is that Darnfors is not properly combined with the primary references (England et al.; and Olsson in view of Ernst, respectively). The applicants also cite pertinent portions of the ASM Metals Reference Book, 3<sup>rd</sup> Edition (considered in the third IDS) in support of their position, in particular of the "silicon effect" within the elemental composition of the alloy. However, the examiner respectfully disagrees, as the primary references set forth the claimed geometries of the reactor tube, in addition to the chromium oxide coating/layer. When taken in view of these primary references, the Darnfors reference discloses an advantageous alloy composition for use in high temperature and/or corrosive environments, as the reactor tubes in the primary references are routinely operated under these harsh conditions (also see examiner's response to arguments in the advisory action mailed November



16, 2004). Furthermore, Darnfors discloses at least overlapping (if not nearly exact) elemental composition ranges of the applicants' claim 1 elemental compositions. Darnfors also indicates a proper motivation for using such elemental composition ranges in harsh environments. Although the Darnfors reference is classified in a "composition" art, rather than a "chemical reactor tube" art, one of ordinary skill in the chemical reactor tube art would have been motivated to find an elemental composition to further improve the performance of chemical reactor tubes against the harsh temperature and corrosion environments occurring in chemical reactors. As a result, this combination of references would not be considered as an improper "non-analogous" art rejection by one of ordinary skill in the chemical reactor tube art. Although the applicants have focused on the silicon content being inappropriate, the examiner respectfully disagrees, as the elemental composition of Darnfors, when taken as a whole, would result in an improvement of the properties of the chemical reactor tubes set forth in the primary references. In their next response, the applicants are respectfully suggested to include a showing of unexpected results in the form of an affidavit/declaration (in addition to the missing foreign priority papers).

In response to applicants' argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a

Art Unit: 1725

reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

### ***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kevin P. Kerns whose telephone number is (571) 272-1178. The examiner can normally be reached on Monday-Friday from 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (571) 272-1171. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kevin P. Kerns *Kevin Kerns 12/23/04*  
Examiner  
Art Unit 1725

KPK

kpk

December 23, 2004